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ABSTRACT

This paper reviews the literature pertaining to Total Quality Management (TQM) and its application in educational settings, especially at institutions of higher education. The review is organized into the following topical areas: the concept of "quality" (usually involving customer satisfaction, executive-level leadership, and employee involvement); TQM philosophy (including use of cross-functional teams), the Baldridge Educational Pilot Program (with 11 criteria for quality education programs); the Muhlenberg College Project (which has been applying TQM to every facet of campus life since 1992); elementary and secondary school renewal; school governance renewal; vocational school renewal (at the George Westinghouse Vocational & Technical High School in New York City); college/university business curriculum renewal (with applications in eight areas of the business curriculum); and TQM in the university. The following implications of TQM for higher education are presented as recommendations: (1) clearly define the concept of quality; (2) recognize the four interlocking assumptions of TQM (quality, people, organizations, and the role of senior management); (3) develop and use cross-functional teams; (4) develop and use a conceptual framework; (5) emphasize executive leadership; and (6) have schools of business lead the way in curriculum improvement. (Contains 10 references.) (MAH)

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# CONTINUOUS IMPROVEMENT AND QUALITY: IMPLICATIONS FOR HIGHER EDUCATION

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# CONTINUOUS IMPROVEMENT AND QUALITY: IMPLICATIONS FOR HIGHER EDUCATION


## ABSTRACT

The purpose of this paper is to discuss the implications of continuous improvement and quality for higher education. The literature pertaining to Total Quality Management(TQM) and its application in educational settings was reviewed. The following topical areas were excerpted from the contemporary research: the concept of "quality"; TQM philosophy, cross-functional teams, the Baldrige educational pilot project, the Muhlenburg College project, elementary and secondary school renewal, school governance renewal, vocational school renewal, college/university business curriculum renewal, and TQM in the university. Implications of TQM for higher education were derived from the review of the related literature and are presented as recommendations.


## BIOGRAPHICAL SKETCH OF THE AUTHOR

Brian C. Satterlee currently serves as professor of business and dean of Adult and Continuing Education at Warner Southern College. Warner Southern College, located in Lake Wales, Florida, is a private, four-year liberal arts institution. Prior to joining Warner Southern in 1992, he was director of Technical and Industrial Education at Seminole Community College. He received his doctorate in Occupational Education from Nova Southeastern University, has published nationally within his discipline, and has presented papers at professional conferences. Dr. Satterlee has consulted with numerous organizations on topics related to strategic management in higher education, human resources development, and the development and evaluation of educational programs and services.

## Introduction

The purpose of this paper is to discuss the implications of continuous improvement and quality for higher education. The paper is divided into two sections: a review of the related literature and implications for higher education which will be derived from the literature.

## Literature Review

The literature pertaining to Total Quality Management (TQM) and its application in educational settings was reviewed. For the purposes of this paper, the following topical areas were excerpted from the contemporary research: the concept of "quality"; TQM philosophy, cross-functional teams, the Baldrige educational pilot project, the Muhlenburg College project, elementary and secondary school renewal, school governance renewal, vocational school renewal, college/university business curriculum renewal, and TQM in the university.

### The Concept of Quality

According to the Council on Competitiveness (1996), the concept of quality has changed drastically since the early 1980's. At that time, quality was thought of as an inspection tool for improving product specifications. It generally represented a separate organizational function within the organization. As the competitive environment evolved during the 1980's so did the notion of quality. High quality products were not enough. In order to remain competitive in world markets, companies had to become more customer-oriented and market-oriented. They had to develop high performance work groups, and aggressively pursue cost reduction. Quality was no longer a separate function. It was the way of doing business. Today, quality is best understood as principles and methods to improve the performance of organizations in achieving their objectives.

While there is no fixed definition of quality in the USA, three factors are widely accepted as central to a successful quality program: customer satisfaction, executive-level leadership, and employee involvement (Council on Competitiveness, 1996).

**TQM Philosophy**

Virtually everything that has been written about TQM explicitly draws on the works of W. Edwards Deming, Joseph Juran and Karou Ishikawa, the primary authorities of the TQM movement. Deming, Ishikawa, and Juran share the view that an organization's primary purpose is to stay in business, so that it can promote the stability of the community, generate products and services that are useful to customers, and provide a setting for the satisfaction and growth of organization members. The TQM strategy for achieving its normal outcome is rooted in four interlocked assumptions about quality, people, organizations, and the role of senior management (Hackman and Wageman, 1995).

The first assumption listed by the authors concerns quality, which is assumed to be costly to an organization than is poor workmanship. A fundamental premise of TQM is that the costs of poor quality (such as inspection, rework, lost customers, and so on) are far greater than the costs of developing processes that produce high-quality products and services. Producing quality products and services is not merely less costly but, in fact, is absolutely essential to long-term organizational survival. The second assumption is about people. Employees naturally care about the quality of work they do and will take initiatives to improve it-so long as they are provided with the tools and training that are needed for quality improvement, and management pays attention to their ideas. The third assumption is that organizations are systems of highly interdependent parts, and the central problems they face invariably cross traditional functional lines. Cross-functional teams should not set overall directions; rather, each line division should set its own goals using local objective-setting procedures. The final assumption concerns senior management. Quality is viewed as ultimately and inescapably the responsibility of top management.

The TQM authorities specify four principles that should guide any organizational interventions intended to improve quality (Hackman and Wageman, 1995). The first is to focus on work processes. The quality of products and services depends most of all on the processes by which they are designed and produced. The second principle is analysis of variability. Uncontrolled variance in processes or outcomes is the primary cause of quality problems and must be analyzed and controlled by those who perform an organization's front-line work. Only when

the root causes of variability have been identified are employees in a position to take appropriate steps to improve work processes. The third principle is management by fact. TQM calls for the use of systematically collected data at every point in a problem-solving cycle, from determining high-priority problems, through analyzing their causes, to selecting and testing solutions. The fourth principle is learning and continuous improvement. The long-term health of an enterprise depends on treating quality improvement as a never-ending quest.

Finally the authors provide the following interventions developed for TQM: explicit identification and measurement of customer requirements; creation of supplier partnerships; use of cross-functional teams to identify and solve quality problems; use of scientific methods to monitor performance and to identify points of high leverage for performance improvement; the use of statistical tools to monitor and analyze work processes.

Literally dozens of "quality tools" have been described in the literature. Three of the most commonly used tools are control charts, Pareto analysis, and cost-of-quality analysis. A *control chart* provides a pictorial representation of the outputs of an ongoing process. Control charts are used to monitor the performance of a process and to determine whether that process is -"in control" -whether the variance produced by the process is random or attributable to specific causes. *Pareto analysis* is used to highlight the cost savings that can be achieved by doing work right the first time.

Other interventions include the use of process management heuristics to enhance team effectiveness. The TQM authorities suggest several techniques to help quality teams use their collective knowledge effectively in identifying and analyzing opportunities to improve quality. Three of the most commonly used devices are flowcharts, brainstorming, and cause-and-effect diagrams. A *flowchart* is a pictorial representation of the steps in a work process. Flowcharts, which use standardized symbols to represent types of activities in a process, help members identify activities that are repetitive, that add no value, or that excessively delay completion of the work. *Brainstorming* is used by groups to generate lists of ideas about matters such as the potential causes of a problem, possible solutions, and the issues likely to be encountered in implementing those solutions. A *Cause and effect diagram* or "fishbone" was developed by Ishikawa to graphically represent the relationship between a problem and its potential causes.

According to the founders of TQM, the five interventions summarized above define the core of total quality management (Hackman and Wageman, 1995).

Cross-Functional Teams

Survey results, books, conferences, and observation indicate that cross-functional teams have become important in today's competitive business environment. Parker (1994) has developed guidelines for managers who are responsible for team development and for leaders of cross functional teams:

1. Insist on clear team goals and plans for achieving them.
2. Work hard to gain the commitment of team members and other stakeholders to achieve team goals.
3. Emphasize collaborative efforts and shared team rewards.
4. Provide training that focuses on working with a diverse group of people.
5. Create policies and procedures that support a team-based environment.

He also listed the following characteristics of cross-functional teams:

1. Speed. Cross-functional teams tend to accomplish tasks quickly because they utilize parallel development rather than serial development.
2. Complexity. Cross-functional teams improve the organization's capacity to solve complex problems because such problems transcend traditional disciplines and functions.
3. Customer focus. Cross functional teams help focus the organization's resources on satisfying customers' needs.
4. Creativity. Cross functional teams help increase the creative capacity of the organization by bringing together people with different backgrounds, orientations, cultural values, and styles.
5. Organizational learning. Cross-functional team members learn more about other disciplines and tend to develop new technical and job skills more readily because they work across job functions.

6. Single point of contact. Members of cross-functional teams promote more effective teamwork by acting as a single source of information and decision making regarding projects and customers (Parker 1994).

Finally, he provides several ways to maximize the effectiveness of cross-functional teams:

1. Leadership. The leaders must have the technical background to understand the subject of their teams' work and to recognize the potential contributions of people from wide variety of backgrounds to understand the subject of their teams' work and to recognize the potential contributions of people from a wide variety of backgrounds. Team leaders also must have the people management skills to facilitate group interaction, especially among people with little experience in working together or, even worse, with bad experiences.
2. Empowerment. Cross-functional teams need the authority to make and implement decisions, but they may not need to know how empowered they're allowed to act. Such confusion can result in inconsistent behavior.
3. Shared goals. Team goals must be clear. They must clearly describe the desired performance outcomes. The goals should be based on a specifically defined problem.
4. Boundary Management. Boundary management is the process by which teams manage their "borders"-the flow of information and resources to and from key stakeholders outside the group.
5. Performance appraisal. Organizations with cross-functional teams should examine their performance-appraisal systems to see whether managers are required or encouraged to incorporate feedback from employees' team leaders.
6. Rewards and recognition. Organizations will always need to recognize outstanding individuals, but an effective recognition program must also reward the collaborative efforts of teams.

7. Interpersonal relationships. A persistent barrier to effective cross-functional teamwork is the failure of people to work well together in groups.
8. Team size. Studies show repeatedly that the ideal team has four to seven members -- certainly no more than 10 members.
9. Managerial support. Effective managerial support can include: providing such resources as time, training, funds, people, and equipment; "talking and walking" teamwork through visual actions; recognizing and rewarding teams and team players; communicating a vision, charter, or broad goals; breaking down such barriers such as paradigms and procedures; and modeling teamwork, in that management itself works as an effective team.

**Baldrige Educational Pilot Program**

Because of increasing efforts in education to institute quality performance management, the Baldrige Award program decided to develop pilot criteria and try them out on volunteer education groups during 1995 (Lewis, 1995). Those who apply will not be eligible for awards but will be used to evaluate the pilot criteria.

The Education Pilot Criteria "are based upon nearly identical core values and concepts and utilize the same seven-part framework used in the Baldrige Award Criteria," according to program staff. These include:

1. Learning-centered education. The key characteristics are setting high developmental expectations and standards for all students; understanding that students may learn in different ways and at different ways and at different rates - the learning-centered school needs to search constantly for alternative approaches to enhance learning;
2. Leadership. Senior administrators need to lead and take part in the development of strategies, systems, and methods for achieving excellence, built on a foundation of continuous improvement.

3. Continuous improvement and organizational learning. Characteristics would include clear goals regarding what to improve; being fact-based; being systematic, with cycles for planning, execution, and evaluation; and a focus on key processes as the route to better results.
4. Faculty and staff participation and development. In the criteria, development means building not only discipline knowledge but also knowledge of student learning styles and of assessment methods.
5. Partnership development. Internal partnerships promote cooperation among groups within the school; external partnerships would include all the stakeholders for a school.
6. Design quality and prevention. The overall design should include clear learning objectives and especially an assessment strategy.
7. Management by fact. Educational improvement must be based in cause - effect thinking built on measurement, information, data, and analysis.
8. Long range view of the future. The most important factor in sustaining long-range improvement is investment in creating and maintaining an assessment system focused on learning.
9. Public responsibility and citizenship. The school should serve as a role model as an institution, promoting public health, safety, ethical business practices, and nondiscrimination.
10. Fast response. The school should have fast and flexible capabilities to respond to the needs of students and other stakeholders.
11. Results orientation. The strategies should explicitly address all student and stakeholder requirements to ensure that actions and plans meet this differing needs.

**Muhlenburg College Project**

Arthur Taylor, president of Muhlenberg College since August 1992, has applied TQM to every facet of campus life from faculty training to student recruitment, fundraising, and career counseling (Mihaly, 1995). This was accomplished via the historic Muhlenberg Plan-In. On Feb. 3, 1993, classes were canceled for the day and every student, professor, secretary, gardener, technician, and other employees of the college were invited to the planning marathon. More than 1,000 attended, breaking into 32 concurrent sessions addressing such concerns as new facilities versus green space, nurturing quality teaching, the college's role in students' social lives, internationalizing the curriculum, and environmental literacy.

He presented his four-part mission in his inaugural speech two years ago - his plan to make Muhlenberg "truly distinctive among colleges":

1. Continuous improvement in student focus. Under Mr. Taylor's plan, TQM transforms students into "customers" and ensures the quality of the academic "product" they've purchased. Their dorms, their security, even their relationship with each other are affected. Academic policies have been redesigned to encourage rather than inhibit student responsibility, recognizing alternatives to classroom learning as valid educational experiences. A student community-service initiative is being developed, faculty student interaction is emphasized though new events created to foster such communication, and a climate of ownership of one's academic goals and efforts is being fostered, among other changes.
2. Continuous improvement in the global experience of faculty and students. Mr. Taylor has pledged to be creative about globalizing Muhlenberg. To that end, in addition to increased faculty and student experiences abroad, Mr. Taylor has created the college of Asian and Western Learning -. As many as 400 students will receive an intense international education, including a full year of study of Japan.
3. Continuous improvement in the supremacy of teaching. The creation of the Faculty Center for Teaching. Conceived by the faculty at one of their

own seminars, the new center is a place where they can immerse themselves in the "scholarship of teaching." Teaching methods are traditionally a minor haphazardly presented aspect of teachers' training, especially at the college level.

4. Continuous improvement in financial strength. In one attempt to harvest as many funding sources as possible, Muhlenberg's evening college will expand from slightly more than 400 students to about 1,000 in the next four years. To attract older students, Saturday morning classes and library privileges for the entire family will be instituted - strategies for "making them feel a part of the place." A nearly total turnover in board-of-trustees membership has improved finances. The rewards from that move were almost immediate. Alumni contributions are up 20% from last year, foundation funds have increased by 50%, and trustee giving has tripled.

**Elementary and Secondary School Renewal**

School improvement is moving away from highly targeted innovations intended to solve specific problems toward a fluid inquiry into how to make education better day to day. The intent is to make all schools learning communities for faculties as well as students -- making use of the most powerful models of learning with both groups. Joyce and Calhoun (1995) state that what is now envisioned is a quantum leap to the "school as a center of inquiry," where faculties continuously examine and improve teaching and learning, and where students study not only what they are learning in the curricular sense, but also their own capability as learners. In this changed culture, school improvement plans are viewed as hypotheses to be tested, not as panaceas. The process is school based, involves the total faculty, builds community, serves to increase student learning through the study of instruction and curriculum, and seeks to provide a nurturant organization through collective study of the health of the school. In essence, school renewal seeks to create environments that promote the continuous examination of the process of education at all levels (Joyce and Calhoun, 1995) .

**School Governance Renewal**

A mood favoring some kind of change in the government and management of public education has already begun at the grassroots level (Lewis, 1994). Administrators have begun to borrow from the industrial movement for Total Quality Management (TQM). Few of these efforts are working as well as expected. Despite the enthusiasm for TQM, most examples of its use in education would embarrass the movement's founder, W. Edward's Deming. The main reason is that most top administrators exempt themselves from the process, and other managers cannot let go of the control of the organization enough to allow the forces for fundamental change to take over.

Why are these well-meaning efforts coming up short? The author suggests at least two reasons. First, most educators underestimate the profound changes taking place throughout society - changes in demographics and economics, in the nature of work, in the global marketplace, and in the impact of technology on how we acquire and deal with knowledge. In the past, schools have been gatekeepers of access to formal knowledge, determining how and in what sequence children and young people learned.

This gap between schools and the rest of the society will only widen as the technology available to students outside of school continues to increase their access to information. The frequent underestimation of the pace and depth of the changes now taking place leads directly to the second reason that educators seem satisfied merely to tinker with the system. This is the lack of good leadership. Preparation programs for administrators, for the most part, reflect what school systems used to be, not what they are becoming. Teacher education and staff development are primarily organized around disjointed ideas, not around the rich knowledge about how children learn that would encourage teachers to take lead in changing outmoded systems.

Can the way most school boards operate today give us an education system appropriate for the 21st century? The author suggested that school boards operate as corporate boards, meeting quarterly to deal with major policy decisions and leaving day-to-day operations up to the management they have selected (Lewis, 1994).

**Vocational School Renewal**

Brooklyn's George Westinghouse Vocational & Technical High School is implementing a TQM process (Del Valle, 1994). With help from companies such as Ricoh, IBM, and Xerox, Peart and her Westinghouse classmates are participating in an educational experiment: learning - and using - Total Quality Management. Westinghouse also uses quality management tenets to improve attendance and parental involvement. Th effort seems to be paying off: Since the school wide program began in 1990, Westinghouse's dropout rate has fallen from 12.9% to 2.1%.

According to the Milwaukee-based American Society for Quality Control, the number of the nation's 15,500 public school districts using TQM for everything from parental involvement to dealing with budget cuts grew to 127 in the last school year -- from 87 the year before. Now the federal government is seeking to promote much wider adoption of the concept, by developing a Baldrige Quality Award for education similar to the Commerce Dept. Honor for quality in business. The school prize, to be issued for the first time in 1996, will recognize excellence in hallmarks of TQM: constant improvements and better results, from higher test scores to lower dropout rates. Judges will look for evidence that students are benefiting not just that the school is teaching TQM principles. "It's a profound shift to emphasizing learning rather than teaching,"

While there are obvious differences between businesses and schools, educators trying to adapt quality principles often use the same techniques and vocabulary - such as "customer satisfaction" and "brainstorming" - as their commercial counterparts.

Children become active participants in their learning. In keeping with TQM's emphasis on gathering data to identify and help solve problems, teachers and administrators monitor attendance and test scores to pinpoint problems, then use the information to brainstorm with students to figure out how to resolve truancy and classroom failures.

In adopting TQM, Westinghouse had to overcome resistance from the New York City Board of Education, which denied the school's request to buy TQM textbooks because they were not on the approved lists of texts. Determined administrators got Motorola Inc. to pay for the books.

As part of the effort to lower the dropout rate, teachers who volunteered to work overtime on a 1992 task force identified 151 students among Westinghouse's 1,600 who were failing every course. By the end of the school year, customized education plans for each student and contracts outlining the responsibilities of students, parents, and teachers shrank that figure to eleven. Although more than half the students come from single-parent families with incomes below the poverty line, parental involvement in the PTA has grown from twelve members in 1991 to 211 last year.

**College/University Business Curriculum Renewal**

Total quality management is, in some ways, contrary to instruction and research practices in the university (Schonberger, 1995). TQM is team-based. Faculty members, however are notorious independents. So are students: it's dog-eat-dog in the classroom. Also, TQM calls for cross-functional thinking, planning, and doing. Faculties and curricula, however, are highly specialized, and professors avidly protect their turf. The author adds that universities are tradition-bound, whereas TQM opts for continuous change.

Despite these gloomy-sounding assessments, TQM initiatives are appearing here and there in academia. There are a few good reasons why this may continue, though perhaps fitfully. They have to do with opportunities to innovate and explore new instructional and research horizons, which have strong appeal for most academics. Business, economics, engineering, and related tool disciplines (information systems, and mathematics/statistics) plus other professional schools, are particularly affected by total quality management.

1. Operations Management (OM). TQM affects nearly of the OM agenda. A primary focus on modeling for efficiency gives way, under TQM, to planning and doing for and with the customer.
2. Marketing. In TQM thinking, the customer is the object. Which university specialty has charge of customers? Marketing. TQM concepts load easily into topic outlines in marketing courses and into marketing research hypotheses.

3. Business Policy and Strategy. Such important TQM-oriented topics as benchmarking, quality function deployment, and customer-centered strategic principles need an academic home. They deal specifically with matters central to the business policy/strategy area: directing internal resources toward enhanced competitiveness and customer retention. To a certain extent, total quality becomes strategy - and perhaps should be taught that way.
4. Corporate Finance. A related area ripe for research is how to give quality, responsiveness, flexibility, and customer satisfaction their due in capital budgeting - instead of relegating such factors to the last page of capital expenditure proposal under the heading "Intangibles."
5. Human Resource Management(HRM). Human resource policies have traditionally favored specialization. Their aim is to narrowly specify jobs through division of labor, then hire people to fill the job. TQM on the other hand, requires cross-training, job switching and breadth of vision. HR departments in superior companies are making transition toward TQM-based practices featuring never-ending training and development of employees.
6. Organizational behavior (OB). TQM related topics have become common in OB journals. For example, *Organizational Dynamics* devoted its entire Spring 1992 issue to the theme. These topics include employee involvement and empowerment (versus participation): non-hierarchical, nonfunctional organization structures, and debates about motivating continuous improvement (accommodating, perhaps, Deming's warnings about performance evaluation).
7. Information Systems(IS). IS practitioners can play an important role in their employers' partners-in-quality efforts with customers and suppliers. Computer-aided design networks, external bar coding, point-of-sale scanning, electronic data interchange, automatic fund transfers, and satellite

communication with freight haulers are among the IS devices that help link firms with suppliers and customers. These expanded uses of IS will naturally interest information systems academics.

8. Mathematics/Statistics. Near the core of TQM is a set of tools known as statistical process control (SPC). At the low end of the SPC methods are the "seven basic tools" - easy to learn and some say, essential in the daily work of the employee.

**TQM in the University**

Coate (1991) describes the implementation of a TQM initiative at Oregon State University. While the author believes that TQM is a relatively simple concept, implementing it in a university setting proved to be a challenging endeavor. The successful implementation of TQM in a college or university setting depends on observing six key principles: support from the top; find a champion; act, do not over analyze; use cross-functional teams; use breakthrough planning; and try the service side first.

## Implications for Higher Education

The following implications of TQM for higher education were derived from the review of the related literature and are presented as recommendations.

1. The concept of quality should be clearly defined by each institution planning to implement a TQM initiative. Universities should begin to move from a focus on the interest of the professor to a more student-centered focus.
2. The TQM initiative should recognize the four interlocking assumptions of TQM, specifically: quality, people, organizations, and the role of senior management. Four principles should guide university TQM interventions: focus on work processes, analysis of variability, management by fact, and learning and continuous improvement. TQM Interventions include: explicit identification and measurement of customer requirements; creation of supplier partnerships; use of cross-functional teams to identify and solve quality problems; use of scientific methods to monitor performance and to

identify points of high leverage for performance improvement; the use of statistical tools to monitor and analyze work processes; and the use of process management heuristics to enhance team effectiveness. Three of the most commonly used devices are flowcharts, brainstorming, and cause-and-effect diagrams.

3. The development and use of cross-functional teams are essential to a successful TQM initiative. Guidelines for developing teams, determining key characteristics of teams, and maximization of effectiveness were identified in the review of the literature.
4. A conceptual framework should be developed and used as a guideline for implementation. The Baldrige Educational Pilot program provides such a framework.
5. Executive leadership is a key success factor. One successful example provided described the implementation of TQM at Muhlenburg College.
6. Schools of business should lead the way in developing continuous improvement in the curriculum process.
7. The successful implementation of TQM in a college or university setting depends on observing six key principles: support from the top; find a champion; act, do not over analyze; use cross-functional teams; use breakthrough planning; and try the service side first.

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